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Figure 8 schematically shows certain embodiments of the invention in which a thermal cycler is computer-controlled.

**IN THE DRAWINGS:**

Please replace Figures 6A and 6B that were submitted in the amendment submitted February 26, 2002, with attached Figures 6A, 6B, 7, and 8.

**IN THE CLAIMS:**

Please cancel claims 32 to 34 and 41 to 43 without prejudice or disclaimer.

Please amend claims to read as follows:

Sup # 17  
30. (Amended) An instrument for use in monitoring a nucleic acid amplification reaction comprising multiple thermal cycles, comprising:

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(a) a thermal cycler capable of alternately heating and cooling, and adapted to receive, at least one reaction vessel containing an amplification reaction mixture comprising a target nucleic acid, reagents for nucleic acid amplification, and a detectable nucleic acid binding agent; and

(b) a detector operable to detect a fluorescence optical signal while the amplification reaction is in progress and without opening the at least one reaction vessel, which fluorescence optical signal is related to the amount of amplified nucleic acid in the reaction vessel.

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31. (Amended) The instrument of claim 30, wherein the thermal cycler is adapted to receive a plurality of reaction vessels, each containing an amplification reaction mixture.

FINNEGAN  
HENDERSON  
PARABOW  
GARRETT &  
DUNNER LLP

1300 I Street, NW  
Washington, DC 20005  
202.408.4000  
Fax 202.408.4400  
www.finnegan.com

7. 30. (Amended) A system for use in monitoring a nucleic acid amplification reaction comprising multiple thermal cycles, comprising:

- (a) at least one reaction vessel adapted to contain an amplification reaction mixture comprising a target nucleic acid, reagents for nucleic acid amplification, and a detectable nucleic acid binding agent;
- (b) a thermal cycler capable of alternately heating and cooling such a reaction vessel, and
- (c) a detector operable to detect a fluorescence optical signal while the amplification reaction is in progress and without opening the at least one reaction vessel, which fluorescence optical signal is related to the amount of amplified nucleic acid in the reaction vessel.

8. 40. (Amended) The system of claim 29, wherein the system comprises a plurality of reaction vessels, each adapted to contain an amplification reaction mixture.

10. 45. (Amended) The system of claim 39, wherein the at least one reaction vessel includes a clear or translucent cap optically coupled to the detector by a sealed light transmission path.

FINNEGAN  
HENDERSON  
FARROW  
GARRETT &  
DUNNER LLP

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Fax 202.408.4400  
www.finnegan.com